

WHAT IS CLAIMED IS:

1. An image processing method comprising:
 - an input step, of inputting at least two medical images taken at different points in time;
 - a difference image generating step, of generating a difference image by positioning two medical images input in said input step and subjecting image signals at corresponding coordinate points to difference processing;
 - a difference image storing step, of storing the difference image generated in said difference image generating step in a storage medium;
 - a reference difference value deciding step, of deciding a reference difference value in the difference image stored in said difference image storing step;
 - a state selecting step, of allowing a user to select a state of shadow change to serve as an indicator of interpreting the difference image generated in said difference image generating step;
 - a difference image processing step, of processing the difference image based on the reference difference value decided in said reference difference value deciding step and the state of shadow change selected in said state selecting step; and
 - an output step, of outputting the difference image

processed in said difference image processing step.

2. An image processing method according to Claim 1, wherein, in said reference difference value deciding step, the reference difference value is decided based on a histogram of difference values in the difference image.

3. An image processing method according to Claim 1, wherein, in said difference image processing step, the difference value of a region in a state not selected in said state selecting step is converted into the reference difference value.

4. An image processing method according to Claim 1, wherein, in said difference image processing step, said difference image is subjected to gradient conversion such that a region in a state not selected in said state selecting step is relatively low in contrast.

5. An image processing method according to Claim 1, further comprising:

a binary image generating step, of binarizing the difference image processed in said difference image processing step to generate a binary image; and
a counting step, of counting the number of regions

having a predetermined area in the binary image generated in said binary image generating step,

wherein the processing results of said counting step are output with the difference image in said output step.

6. An image processing method according to Claim 1, wherein the state of shadow change to be selected by a user in said state selecting step is selected from at least one of a state of displaying all shadows, a state of displaying increase of a shadow, and a state of displaying disappearance of a shadow.

7. An image processing apparatus comprising:

input means for inputting at least two medical images taken at different points in time;

difference image generating means for generating a difference image by positioning two medical images input by said input means and subjecting image signals at corresponding coordinate points to difference processing;

difference image storing means for storing the difference image generated by said difference image generating means in a storage medium;

reference difference value deciding means for deciding a reference difference value in the difference image stored by said difference image storing means;

state selecting means for allowing a user to select a state of shadow change to serve as an indicator of interpreting the difference image generated by said difference image generating means;

difference image processing means for processing the difference image based on the reference difference value decided by said reference difference value deciding means and the state of shadow change selected by said state selecting means; and

output means for outputting the difference image processed by said difference image processing means.

8. An image processing apparatus according to Claim 7, wherein said reference difference value deciding means decides the reference difference value based on a histogram of difference values in the difference image.

9. An image processing apparatus according to Claim 7, wherein said difference image processing means converts the difference value of a region in a state not selected by said state selecting means into the reference difference value.

10. An image processing apparatus according to Claim 7, wherein said difference image processing means subjects the difference image to gradient conversion such that a region

in a state not selected by said state selecting means is relatively low in contrast.

11. An image processing apparatus according to Claim 7, further comprising:

binary image generating means for binarizing the difference image processed by said difference image processing means to generate a binary image; and counting means for counting the number of regions having a predetermined area in the binary image generated by said binary image generating means,

wherein the processing results of said counting means are output with the difference image by said output means.

12. An image processing apparatus according to Claim 7, wherein the state of shadow change to be selected by a user by said state selecting means is selected from at least one of a state of displaying all shadows, a state of displaying increase of a shadow, and a state of displaying disappearance of a shadow.

13. An image processing method for generating a difference image from a first image and a second image, said method comprising:

a control step, of deciding a gradient processing

method such that shadow change regions are displayed in a predetermined manner based on image attributes of the first image and the second image;

a gradient processing step, of performing predetermined gradient processing on the first image and/or the second image following the decision in said control step; and

a computing step, of computing a difference image from the first image and the second image processed in said gradient processing step.

14. An image processing method according to Claim 13, said control step further comprising:

an image attributes acquisition step, of acquiring image attributes of the first image and the second image; and

a shadow definition input step in which a user selects a display method,

wherein a gradient processing method is decided so as to carry out the display method input in said shadow definition input step, based on the image attributes of the first image and the second image acquired in said image attributes acquisition step.

15. An image processing method according to Claim 13, wherein said gradient processing step includes a gradient

inversion step, in which gradient inversion processing is performed on the first image and/or the second image.

16. An image processing method according to Claim 13, wherein said control step includes an image attributes information attaching step, of deciding image attributes of the difference image obtained in said computing step according to the image attributes and the display method, and attaching the decided image attributes to the difference image.

17. An image processing method according to Claim 13, wherein the first image and the second image are images taken of the same portion of a human body at different points in time.

18. An image processing method according to Claim 14, wherein selecting the display method defines whether increases or decreases in shadows in the difference image are to be represented as high-luminance regions or low-luminance regions.

19. An image processing method according to Claim 16, wherein said image attributes information attaching step includes attaching image attributes information representing

the gradient of the difference image.

20. An image processing apparatus for generating a difference image from a first image and a second image, said apparatus comprising:

control means for deciding an image processing method such that shadow change regions are displayed in a predetermined manner based on image attributes of the first image and the second image;

gradient processing means for performing predetermined gradient processing on the first image and/or the second image following the decision of said control means; and

computing means for computing a difference image from the first image and the second image processed by said gradient processing means.

21. An image processing apparatus according to Claim 20, said control means further comprising:

image attributes acquisition means for acquiring image attributes of the first image and the second image; and

shadow definition input means by means of which a user selects a display method,

wherein a processing display method is decided so as to carry out the display method input by said shadow definition input means, based on the image attributes of the first

image and the second image acquired by said image attributes acquisition means.

22. An image processing apparatus according to Claim 20, wherein said gradient processing means includes gradient inversion means, where gradient inversion processing is performed on the first image and/or the second image.

23. An image processing apparatus according to Claim 20, wherein said control means includes image attributes information attaching means for deciding image attributes of the difference image obtained by said computing means according to the image attributes and the display method, and attaching the decided image attributes to the difference image.

24. An image processing apparatus according to Claim 20, wherein the first image and the second image are images taken of the same portion of a human body at different points in time.

25. An image processing apparatus according to Claim 20, wherein selection of the display method by the user defines whether increases or decreases in shadows in the difference image are to be represented as high-luminance

regions or low-luminance regions.

26. An image processing apparatus according to Claim 23, wherein said image attributes information attaching means attaches image attributes information representing the gradient of the difference image.

27. A program for causing a computer to execute the processing steps of the image processing method according to any one of Claims 1 through 6 and Claims 13 through 19.

28. A computer-readable storage medium storing a program for causing a computer to execute the processing steps of the image processing method according to any one of Claims 1 through 6 and Claims 13 through 19.

29. A program for causing a computer to execute the functions of the image processing apparatus according to any one of Claims 7 through 12 and Claims 20 through 26.

30. A computer-readable storage medium storing a program for causing a computer to execute the functions of the image processing apparatus according to any one of Claims 7 through 12 and Claims 20 through 26.